

## DIRECT WRITING OF OPTICAL DEVICES IN SILICA-BASED GLASS USING FEMTOSECOND PULSE LASERS

### Abstract

[89] The invention relates to methods of writing a light-guiding  
5 structure in a bulk glass substrate. The bulk glass substrate is  
preferably made from a soft silica-based material having an annealing  
point less than about 1380°K. A pulsed laser beam is focused within  
the substrate while the focus is translated relative to the substrate  
along a scan path at a scan speed effective to induce an increase in  
10 the refractive index of the material along the scan path. Substantially  
no laser-induced physical damage of the material is incurred along the  
scan path. Various optical devices can be made using this method.

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